

VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a Major, Municipal permit. The effluent limitations contained in this permit will maintain the Water Quality Standards (WQS) of 9VAC25-260. The proposed discharge will result from the operation of a municipal sewage treatment plant (SIC Code: 4952 - Sewerage Systems). This permit action consists of reissuing the permit with revisions to the permit, as needed, due to changes in applicable laws, guidance, and available technical information.

1. Facility Name and Address:
Opequon Water Reclamation Facility (WRF)
PO Box 43
Winchester, VA 22604
Location: 3100 Berryville Pike, Winchester
2. Permit No. VA0065552; Expiration Date: June 30, 2016
3. Owner: Frederick – Winchester Service Authority
Contact Name: Mr. Jesse Moffett
Title: Executive Director
Telephone No: (540) 722-3579
Email: jmoffet@fredwin.com
4. Description of Treatment Works Treating Domestic Sewage:
Total Number of Outfalls: 1

The Opequon WRF primarily receives sewage wastewater generated by residents and businesses with the balance of the flow generated by commercial and industrial contributors (see permit reissuance application Form 2A, Part F). The facility has an approved Industrial Pretreatment Program for regulating the non-domestic contributors' wastewater quality. The treatment units comprising the facility are shown in the schematics included in the permit reissuance application.

Average Discharge Flow (Jan 2014 – Dec 2015) = 7.2 MGD
Design Average Flow = 12.6 MGD

5. Application Complete Date: January 4, 2016

| | |
|-------------------------------|--------------------|
| Permit Writer: Dawn Jeffries | Date: May 25, 2016 |
| Reviewed By: Brandon Kiracofe | Date: June 7, 2016 |

Public Comment Period: xxx to xxx

6. Receiving Stream Name: Opequon Creek
River Mile: 32.66
Use Impairment: Yes (see items 11 and 12 below)
Special Standards: pH
Tidal Waters: No
Watershed Name: VAV – B08R Upper Opequon Creek
Basin: Potomac; Subbasin: None
Section: 11; Class: IV
7. Operator License Requirements per 9VAC25-31-200.C: Class I
8. Reliability Class per 9VAC25-790: Class II (assigned w/ December 2010 Certificate to Operate (CTO))

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9. Permit Characterization:

- ☐ Private ☐ Federal ☐ State ☒ POTW ☐ PVOTW
☐ Possible Interstate Effect ☐ Interim Limits in Other Document (attach copy of CSO)

10. Discharge Location Description and Receiving Waters Information: Appendix A

11. Antidegradation (AD) Review & Comments per 9VAC25-260-30:

Tier Designation: Tier 1

The State Water Control Board's WQS include an AD policy. All state surface waters are provided one of three levels of AD protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 waters have water quality that is better than the WQS. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 waters are exceptional waters and are so designated by regulatory amendment. The AD policy prohibits new or expanded discharges into exceptional waters.

The AD review begins with a Tier determination. Opequon Creek downstream of the facility discharge location is determined to be Tier 1 because the stream does not meet the General Standard (Benthics) for aquatic life use. AD baselines are not calculated for Tier 1 waters.

12. Impaired Use Status Evaluation per 9VAC25-31-220.D: Opequon Creek in the vicinity of the discharge is listed as impaired for not meeting the General Standard (Benthics) for aquatic life use. This section of river is also listed as having elevated levels of coliform bacteria. A Total Daily Maximum Load (TMDL) addressing these impairments includes the following waste load allocations (WLAs) for this discharge:

E. coli: 2.12×10^{13} cfu/yr (based on a design flow of 12.2 MGD and a concentration of 126 cfu/100 mL)
Sediment 505.71 t/yr (based on a design flow of 12.2 MGD and a concentration of 30 mg/100 mL)

13. Site Inspection: Performed by Dawn Jeffries on March 10, 2016

14. Effluent Screening and Effluent Limitations: Appendix B

15. Effluent toxicity testing requirements included per 9VAC25-31-220.D: ☒ Yes ☐ No Appendix B

16. Sewage sludge generated at this facility is transported to the Frederick County Regional Landfill for disposal. The VPDES Permit application serves as the Sludge Management Plan to be approved with the reissuance of the permit.

17. Bases for Special Conditions: Appendix C

18. Material Storage per 9VAC25-31-280.B.2: This permit requires that the facility's O&M Manual include information to address the management of wastes, fluids, and pollutants which may be present at the facility, to avoid unauthorized discharge of such materials.

19. Antibacksliding Review per 9VAC25-31-220.L: This permit complies with the antibacksliding provisions of the VPDES Permit Regulation.

20. Regulation of Users per 9VAC25-31-280.B.9: N/A – This facility is owned by a municipality.

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21. Stormwater Management per 9VAC25-31-120: Application Required? ☒ Yes ☐ No
Because the Opequon WRF has a design flow ≥ 1.0 MGD, a stormwater application is required. A No Exposure Certification (NEC) for Exclusion from VPDES Storm Water Permitting was submitted on March 9, 2016 and was sent to DEQ inspectors for review and concurrence on March 9, 2016. No stormwater requirements have been included in the permit. The NEC is to be approved with the reissuance of the permit. If conditions change at the facility, and any industrial materials or activities become exposed to stormwater, coverage under a VPDES permit must be obtained prior to any point source discharge of stormwater from the facility.
22. Compliance Schedule per 9VAC25-31-250: There are no compliance schedules included in the reissued permit.
23. Variances/Alternative Limits or Conditions per 9VAC25-31-280.B, 100.K, and 100.N: None.
24. Financial Assurance Applicability per 9VAC25-650-10: N/A – This facility is owned by a municipality.
25. Virginia Environmental Excellence Program (VEEP) Evaluation per § 10.1-1187.1-7: At the time of this reissuance, is this facility considered by DEQ to be a participant in the Virginia Environmental Excellence Program in good standing at either the Exemplary Environmental Enterprise (E3) level or the Extraordinary Environmental Enterprise (E4) level? ☐ Yes ☒ No
26. Nutrient Trading Regulation per 9VAC25-820: See Appendix B
General Permit Required: ☒ Yes ☐ No
This facility is required to maintain coverage under the General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen (TN) and Total Phosphorus (TP) Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9VAC25-820) because it is listed with a WLA in the Registration List in 9 VAC 25-820-70.
27. Nutrient monitoring included per Guidance Memo No. 14-2011: ☐ Yes ☒ No
This facility is a Significant Discharger as defined in the Nutrient Trading Watershed General Permit (WGP) Regulation 9 VAC 25-820 and is actively monitoring and reporting under the WGP. This permit does not include any outfalls that discharge solely stormwater exposed to industrial activity.
28. Threatened and Endangered (T&E) Species Screening per 9VAC25-260-20 B.8: Because this is not an issuance or reissuance that allows increased discharge flows, T&E screening is not automatically required. However, in accordance with the VPDES Memorandum of Understanding, T&E screening was coordinated on December 23, 2015 through DCR based upon request. Comments were received from DCR on January 15, 2016 and are included in the permit processing file. Comments were considered in the drafting of the permit and were also forwarded to the permittee.
29. Public Notice Information per 9VAC25-31-280.B: All pertinent information is on file, and may be inspected and copied by contacting Dawn Jeffries at: DEQ-Valley Regional Office, P.O. Box 3000, Harrisonburg, Virginia 22801, Telephone No. (540) 574-7898, dawn.jeffries@deq.virginia.gov.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following

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the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

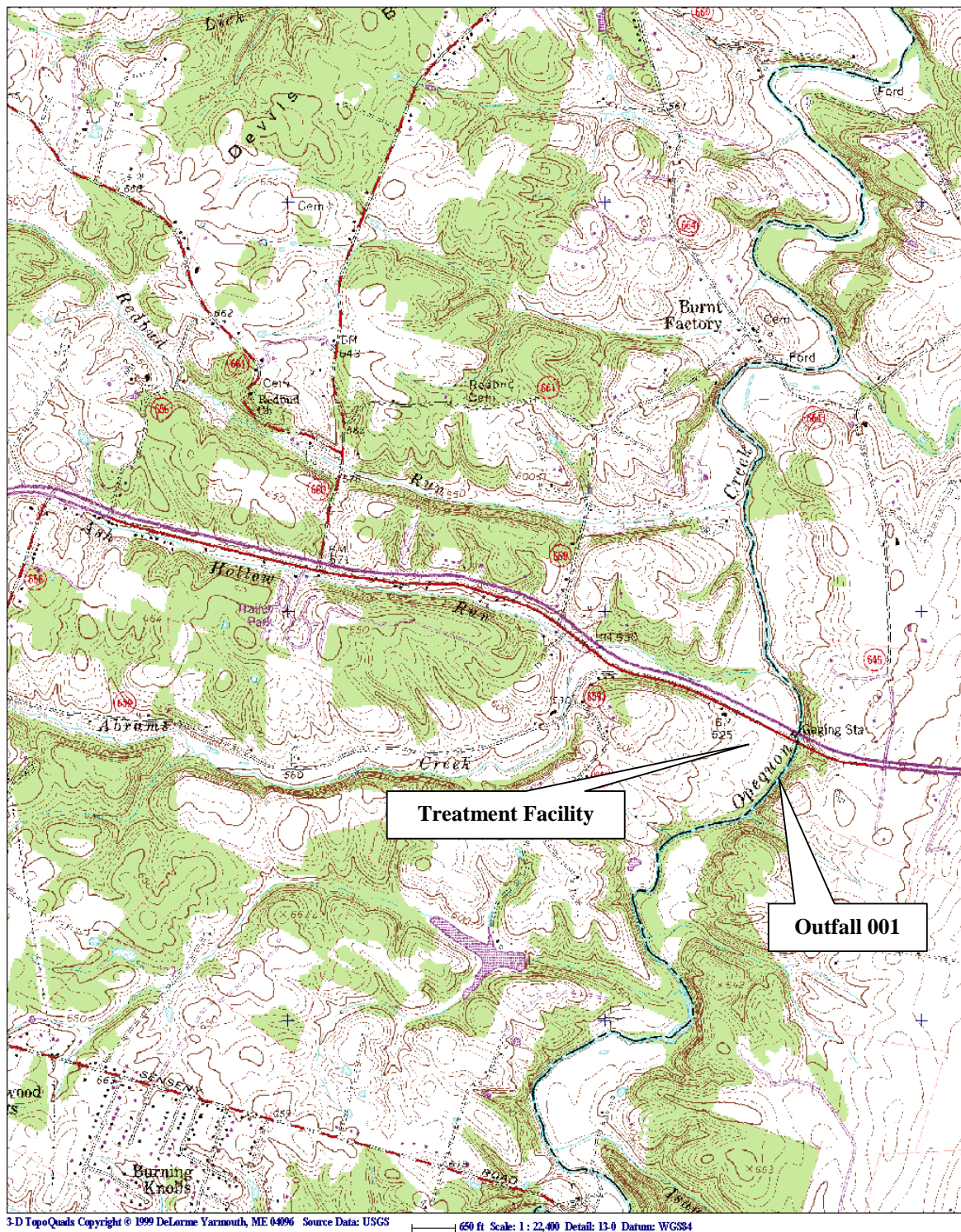
30. Historical Record:

| EVENT | DATE |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------|
| VPDES PERMIT ISSUANCE w/ DAF = 5.0 MGD. | 2/7/85 |
| VPDES PERMIT MODIFICATION w/ DAF = 5.0 MGD. | 2/11/87 |
| VPDES PERMIT REISSUANCE w/ DAF = 6.25 MGD. | 2/11/91 |
| VPDES PERMIT REISSUANCE w/ DAF = 6.25 MGD. | 2/1/96 |
| VPDES PERMIT MODIFICATION w/ DAF = 6.25 MGD and an additional flow tier w/ DAF = 8.4 MGD (Jun-Nov), 16.0 MGD (Dec-May) | 6/24/97 |
| VPDES PERMIT REISSUANCE w/ DAF = 8.4 MGD (Jun-Nov), 16.0 MGD (Dec-May). | 2/11/01 |
| VPDES PERMIT REISSUANCE w/ DAF = 8.4 MGD and Seasonal (Dec-May) Flow Tier of 16.0 MGD. Expanded Flow Tiers w/ DAF = 10.4 MGD and 12.6 MGD. | 7/7/2006 |
| CTO for 12.6 MGD FACILITY | 12/28/10 |
| VPDES PERMIT REISSUANCE w/ DAF = 12.6 MGD | 4/27/11 |

APPENDIX A

DISCHARGE LOCATION AND RECEIVING WATERS INFORMATION

Opequon WRF discharges to Opequon Creek in Frederick County. The topographical map included below shows the location of the treatment facility and Outfall 001.



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PLANNING INFORMATION

Relevant points of interest within the watershed and in the vicinity of the discharge are shown on the Water Quality Assessments Review table below.

| WATER QUALITY ASSESSMENTS REVIEW | | | | | | |
|------------------------------------------------------------------------------------------------------|---------------------|---------------|-------------|----------------|------------------------|----------|
| POTOMAC-SHENANDOAH RIVER BASIN | | | | | | |
| 12/30/2015 | | | | | | |
| IMPAIRED SEGMENTS | | | | | | |
| SEGMENT ID | STREAM | SEGMENT START | SEGMENT END | SEGMENT LENGTH | PARAMETER | |
| B08R-01-BAC | Opequon Creek | 57.47 | 32.66 | 24.81 | E-coli | |
| B08R-01-BEN | Opequon Creek | 57.47 | 32.66 | 24.81 | Benthic | |
| B09R-01-BAC | Abrams Creek | 10.58 | 0.00 | 10.58 | Fecal Coliform | |
| B09R-01-BEN | Abrams Creek | 10.58 | 0.00 | 10.58 | Benthic | |
| B09R-02-BAC | Opequon Creek | 32.66 | 23.56 | 9.1 | Fecal Coliform, E-coli | |
| B09R-02-BEN | Opequon Creek | 32.66 | 23.56 | 9.1 | Benthic | |
| B09R-04-BAC | Redbud Run | 8.05 | 0.00 | 8.05 | Fecal Coliform, E-coli | |
| B09R-04-BEN | Redbud Run | 8.05 | 0.00 | 8.05 | Benthic | |
| PERMITS | | | | | | |
| PERMIT | FACILITY | STREAM | RIVER MILE | LAT | LONG | WBID |
| VA0065552 | Opequon Water Recla | Opequon Creek | 32.66 | 391036 | 0780429 | VAV-B08R |
| MONITORING STATIONS | | | | | | |
| STREAM | NAME | RIVER MILE | RECORD | LAT | LONG | |
| Abrams Creek | 1AABR000.56 | 0.56 | | 391045 | 0780508 | |
| Abrams Creek | 1AABR000.76 | 0.76 | 4/20/73 | 391045 | 0780509 | |
| Dry Marsh Run | 1ADRS000.11 | 0.11 | 7/3/15 | 391135 | 0780409 | |
| Opequon Creek | 1AOPE031.26 | 31.26 | 6/21/73 | 391136 | 0780426 | |
| Opequon Creek | 1AOPE032.52 | 32.52 | 3/4/70 | 391041 | 0780424 | |
| Opequon Creek | 1AOPE033.44 | 33.44 | 8/22/73 | 391011 | 0780452 | |
| Redbud Run | 1ARED001.24 | 1.24 | 4/25/79 | 391120 | 0780549 | |
| Redbud Run | 1ARED001.61 | 1.61 | 4/20/73 | 391133 | 0780621 | |
| Abrams Creek | 1AABR000.78 | 0.78 | 8/25/76 | 391043 | 0780508 | |
| Redbud Run | 1ARED000.46 | 0.46 | 7/1/91 | 391113 | 0780505 | |
| Opequon Creek | 1AOPE034.53 | 34.53 | 6/9/05 | 390938 | 0780504 | |
| PUBLIC WATER SUPPLY INTAKES | | | | | | |
| OWNER | STREAM | RIVER MILE | | | | |
| None | | | | | | |
| WATER QUALITY MANAGEMENT PLANNING REGULATION | | | | | | |
| Is this discharge addressed in the WQMP regulation? Yes | | | | | | |
| If Yes, what effluent limitations or restrictions does the WQMP regulation impose on this discharge? | | | | | | |
| PARAMETER | ALLOCATION | | | | | |
| BOD5 | 207 kg/d | | | | | |
| CBOD | 1514 kg/d (Dec-May) | | | | | |
| Nutrients Under the Watershed General Permit | | | | | | |
| WATERSHED NAME | | | | | | |
| VAV-B08R Upper Opequon Creek | | | | | | |

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FLOW FREQUENCY DETERMINATION

The Opequon WRF discharges to Opequon Creek near Berryville, Virginia. While the period of record for the reference gage has not changed since the previous memo, some of the previously determined stream flow frequencies are no longer required. This updated memo will be used for developing effluent limitations for the VPDES permit reissuance.

The VDEQ operated a continuous record gage on Opequon Creek near Berryville, Virginia (#01615000) from 1943-1997. The gage is located downstream of the discharge point at the Route 7 bridge in Frederick County, Virginia. In July 1988, approximately 1000 feet upstream of the gage, the Opequon WRF began discharging from a 6.0 MGD facility to Opequon Creek. Therefore, the flow frequencies for the reference gage are based only on the period of record from 1943 to 1988. Since the Parkins Mill WWTF did not begin discharging to Opequon Creek until about September 1989, its flow did not impact the gage during the selected period of record. Due to the proximity of the gage to the Opequon WRF outfall, the values for the gage are applied directly to the discharge point. This analysis does not address any other discharges, withdrawals, or springs that may be located between the gage and the discharge point. The flow frequencies for the reference gage/discharge point are presented below.

Updated Opequon Creek Water Quality Models were submitted by the permittee in 2012 and 2016. For these model updates, 7Q10 and HF7Q10 flows were determined using all streamflow data from 1943-2015, adjusted for effluent flows from Opequon WRF and Parkins Mill WWTF. These flows of a 7Q10 of 2.4 cfs (1.55 mgd) and a HF7Q10 of 5.3 cfs (3.42 mgd) have been used in permit development.

Opequon Creek near Berryville:

Drainage Area = 58.2 mi²

| | | | | | |
|---------|----------|------------|-------------------|----------|------------|
| 1Q30 = | 0.58 cfs | (0.37 mgd) | High Flow 1Q10 = | 3.11 cfs | (2.01 mgd) |
| 1Q10 = | 1.07 cfs | (0.69 mgd) | High Flow 7Q10 = | 4.10 cfs | (2.65 mgd) |
| 7Q10 = | 1.49 cfs | (0.96 mgd) | High Flow 30Q10 = | 6.65 cfs | (4.30 mgd) |
| 30Q10 = | 2.18 cfs | (1.41 mgd) | HM = | 10.3 cfs | (6.66 mgd) |
| 30Q5 = | 3.12 cfs | (2.02 mgd) | | | |

The high flow months are December through May for this analysis.

REVIEWER: BWC

DATE: 2/25/16

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EFFLUENT/STREAM MIXING EVALUATION

Mixing zone predictions were made with the Virginia DEQ Mixing Zone Analysis Version 2.1 program. The predictions are based on the discharge and receiving stream characteristics, and are presented below.

| Annual Mix | Wet Season Mix |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Effluent Flow = 12.6 MGD Stream 7Q10 = 1.55 MGD Stream 30Q10 = 1.41 MGD Stream 1Q10 = 0.69 MGD Stream slope = 0.00114 ft/ft Stream width = 45 ft Bottom scale = 3 Channel scale = 1</p> <p>-----</p> <p>Mixing Zone Predictions @ 7Q10</p> <p>Depth = 1.0573 ft Length = 1790.13 ft Velocity = .4604 ft/sec Residence Time = .045 days</p> <p>Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.</p> <p>-----</p> <p>Mixing Zone Predictions @ 30Q10</p> <p>Depth = 1.0509 ft Length = 1799.5 ft Velocity = .4586 ft/sec Residence Time = .0454 days</p> <p>Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.</p> <p>-----</p> <p>Mixing Zone Predictions @ 1Q10</p> <p>Depth = 1.0176 ft Length = 1850.27 ft Velocity = .4493 ft/sec Residence Time = 1.144 hours</p> <p>Recommendation: A complete mix assumption is appropriate for this situation providing no more than 87.41% of the 1Q10 is used.</p> | <p>Effluent Flow = 12.6 MGD Stream 7Q10 = 3.42 MGD Stream 30Q10 = 4.30 MGD Stream 1Q10 = 2.01 MGD Stream slope = 0.00114 ft/ft Stream width = 45 ft Bottom scale = 3 Channel scale = 1</p> <p>-----</p> <p>Mixing Zone Predictions @ 7Q10</p> <p>Depth = 1.1407 ft Length = 1676.48 ft Velocity = .4831 ft/sec Residence Time = .0402 days</p> <p>Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.</p> <p>-----</p> <p>Mixing Zone Predictions @ 30Q10</p> <p>Depth = 1.1787 ft Length = 1629.59 ft Velocity = .4932 ft/sec Residence Time = .0382 days</p> <p>Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.</p> <p>-----</p> <p>Mixing Zone Predictions @ 1Q10</p> <p>Depth = 1.0782 ft Length = 1760.21 ft Velocity = .4661 ft/sec Residence Time = 1.049 hours</p> <p>Recommendation: A complete mix assumption is appropriate for this situation providing no more than 95.33% of the 1Q10 is used.</p> |

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SITE VISIT

On March 10, 2016 the writer performed a site visit at the subject facility. John Merriner and Richard Wadkins of FWSA were also present. The site visit included a visual inspection of Opequon Creek at the outfall.



Upstream view from outfall



Downstream view from outfall

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APPENDIX B

EFFLUENT SCREENING AND EFFLUENT LIMITATIONS

EFFLUENT LIMITATIONS

A comparison of technology and water quality-based limits was performed and the most stringent limits were selected, as summarized in the table below.

Outfall 001

Final Limits

Design Flow: 12.6 MGD

| PARAMETER | BASIS FOR LIMITS | EFFLUENT LIMITATIONS | | | | MONITORING REQUIREMENTS | |
|---------------------------------------------------------------------|------------------|----------------------|-----------|----------------|-----------|---------------------------------------------|-------------|
| | | Monthly Average | | Maximum | | Frequency | Sample Type |
| Flow (MGD) | 1 | NL | | NL | | Continuous | TIRE |
| ----- | ----- | Monthly Average | | Weekly Average | | ----- | ----- |
| BOD ₅ (Jun-Nov) | 3,4,5 | 7 mg/L | 207 kg/d | 10 mg/L | 480 kg/d | 1/Week | 24 HC |
| BOD ₅ (Dec-May) | 3,4,5 | 25 mg/L | 1200 kg/d | 40 mg/L | 1900 kg/d | 1/Week | 24 HC |
| TSS | 6 | 29 mg/L | 1400 kg/d | 44 mg/L | 2100 kg/d | 1/Month | 24 HC |
| Ammonia-N (Jun-Nov) (mg/L) | 3 | 1.5 | | 1.8 | | 1/Day | 24 HC |
| Ammonia-N (Dec-May) (mg/L) | 3 | 2.3 | | 2.8 | | 1/Day | 24 HC |
| Effluent Chlorine (TRC)(mg/L)* | 3 | 0.0076 | | 0.0081 | | 1/2 Hours | Grab |
| Chloride (mg/L) | 3 | NL | | NL | | 1/6 Months | 24 HC |
| E. coli (N/100 mL) (geometric mean) | 3,6 | 122 | | NA | | 4/Month * or 1/Day** 10 am to 4 pm | Grab |
| ----- | ----- | Annual Average | | Maximum | | ----- | ----- |
| TP – Year to Date (mg/L) | 8 | NL | | NA | | 1/Month | Calculated |
| TP – Calendar Year (mg/L) | 8,9 | 0.30 | | NA | | 1/Year | Calculated |
| TN – Year to Date (mg/L) | 8 | NL | | NA | | 1/Month | Calculated |
| TN – Calendar Year (mg/L) | 8,9 | 3.0 | | NA | | 1/Year | Calculated |
| ----- | ----- | Minimum | | Maximum | | ----- | ----- |
| pH (S.U.) | 3 | 6.5 | | 9.5 | | 1/Day | Grab |
| Dissolved Oxygen (mg/L) | 3,4 | 7.1 | | NA | | 1/Day | Grab |
| Contact Chlorine (TRC)(mg/L)* | 7,11 | 0.25 | | NA | | 1/Hour | Grab |
| Chronic Whole Effluent Toxicity (TUC) <i>Ceriodaphnia dubia</i> | 10 | NA | | 1.64 | | 1/Year | 24 HC |
| Chronic Whole Effluent Toxicity (TUC) <i>Pimephales promelas</i> | 10 | NA | | 1.64 | | 1/Year | 24 HC |

Refer to permit for definitions of monitoring frequencies and sample types

* Applicable only when chlorination is used for disinfection

** Applicable if an alternative to chlorination is used for disinfection

BASIS DESCRIPTIONS

1. VPDES Permit Regulation (9VAC25-31)
2. Federal Effluent Requirements (Secondary Treatment Regulation - 40CFR133)
3. Water Quality Standards (9VAC25-260)
4. Opequon Creek Capacity Study - 2012 Water Quality Model and 2016 Model Update
5. WQMP Regulation (9VAC25-720-50)
6. Opequon Creek TMDL Reports approved 6/28/05 and 12/20/05
7. Professional Judgment (PJ)
8. GM No. 07-2008, Amendment No. 2, 10/23/07, Permitting Considerations for Facilities in the Chesapeake Bay Watershed
9. Annual average concentration limits are based on the Technology Regulation (9VAC25-40)
10. Limit carried forward based on 9VAC25-31-220.L
11. FWSA 1991 chlorine disinfection performance demonstration

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LIMITING FACTORS – OVERVIEW:

The following potential limiting factors have been considered in developing this permit and fact sheet:

| | |
|--------------------------------------------------------------|--------------------------------------------------------------------|
| Water Quality Management Plan Regulation (WQMP) (9VAC25-720) | |
| A. TMDL limits | E. coli, TSS |
| B. Non-TMDL WLAs | BOD₅ |
| C. CBP (TN & TP) WLAs | TN and TP via GP VAN010057 |
| Federal Effluent Guidelines | BOD₅, TSS, pH |
| BPJ/Agency Guidance limits | TRC (contact) |
| Water Quality-based Limits - numeric | BOD₅, DO, TRC (effluent), E. coli, pH, Ammonia-N |
| Water Quality-based Limits - narrative | None |
| Technology-based Limits (9VAC25-40-70) | TN, TP |
| Whole Effluent Toxicity (WET) | See pages B-11 to B-13 |
| Stormwater Limits | NEC approved with reissuance of the permit |

EVALUATION OF THE EFFLUENT – CONVENTIONAL POLLUTANTS:

The permittee submitted an updated stream model dated May 16, 2016 for Opequon Creek that includes the discharges from Opequon WRF and Parkins Mill WWTF.

The model indicates that the values shown below are protective of instream WQS for dissolved oxygen.

| | June – November | December – May |
|-------------------------|-----------------|----------------|
| BOD ₅ (mg/L) | 7 | 25 |
| TKN (mg/L) | 3.2 | 5.8 |
| DO (mg/L) | 7.1 | 7.1 |

The modeled BOD₅ limits shown above have been applied in the permit. The Jun-Nov limit is identical to that in the previous permit. The Dec-May BOD₅ limit replaces the previous Dec-May CBOD₅ limit of 25 mg/L. This approach is considered to be appropriate as it reflects the use of the CBOD_u/BOD₅ ratio determined from site-specific data and used for modeling. In addition to the concentration limits, the Water Quality Management Plan for Opequon Creek restricts this discharge to 207 kg/d BOD₅ (Jun-Nov) and 1,514 kg/d CBOD₅ (Dec-May). These WQMP allocations are met by the limits applied in the permit.

Modeled TKN values are more than twice the Ammonia-N WLAc; therefore, the Ammonia-N limits based on chronic toxicity imposed in the permit are deemed adequate for ensuring compliance with the modeled TKN values, and no TKN limits have been included in this permit.

Since the Ammonia-N limits control the treatment levels for BOD₅ and Ammonia-N is monitored daily, the monitoring frequency for BOD₅ has been applied as 1/Week.

The DO limits have been carried forward from the previous permit.

The TSS limits have been carried forward and are consistent with the Secondary Treatment Regulation, with the Chesapeake Bay TMDL WLA for TSS of 1,151,222 lbs/yr and with the facility's assigned sediment WLA of 505.71 metric tons/year in the Opequon Creek TMDL.

The pH limits reflect the current WQS for pH in the receiving stream and have been carried forward from the previous permit.

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EVALUATION OF THE EFFLUENT – DISINFECTION:

The FWSA completed an evaluation in 1991 demonstrating the facility could achieve adequate effluent disinfection with a chlorine contact tank TRC residual of 0.25 mg/L. This value has been applied as the chlorine contact tank TRC limit since the demonstration, as bacteria data continue to indicate adequate disinfection. The 99th percentile of all effluent samples from the previous permit term is 23.7 N/100 mL. The highest geometric mean of any month in the previous permit term is 27.3 N/100 mL and the highest single sample value for the weekly samples over the previous permit term is 58.5 N/100 mL. The previous limit has been carried forward at this reissuance as well as the requirement of a contact tank monitoring frequency of 1/Hour. In addition to the minimum TRC contact requirements, E. coli monitoring at a frequency of 4/Month and an associated limit have also been carried forward to ensure effective disinfection is achieved. If an alternative to chlorination is utilized, E. coli monitoring at a frequency of 1/Day and an associated limit have been included at this reissuance. The E. coli limits are consistent with the TMDL WLA of 2.12×10^{13} cfu/yr and are protective of the current WQS for E. coli in the receiving stream.

EVALUATION OF THE EFFLUENT – NUTRIENTS:

In accordance with § 62.1-44.19:14.C.5. of the Code of Virginia, this Significant Discharger has submitted a Registration Statement and DEQ has recognized that they are covered under the General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for TN and TP Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9VAC25-820) (GP). The load limit for TN is 121,851 pounds per calendar year and for TP is 11,512 pounds per calendar year. Opequon WRF is “bubbled” with their other facilities.

The Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed (9VAC25-40-70) stipulates the inclusion of technology-based effluent concentration limits in the individual permit for any facility that has installed technology for the control of nitrogen and phosphorous whether by new construction, expansion, or upgrade. Technology based annual average effluent concentration limits of TN = 3.0 mg/L and TP = 0.30 mg/L have been carried forward. At these annual average concentrations and design flows, the load limits will be met without the need to offset any nutrient loads.

EVALUATION OF THE EFFLUENT – TOXICS:

Stream: Water quality data for the receiving stream were obtained from Ambient Monitoring Station No. 1A0PE036.13 on Opequon Creek at the Route 655 Bridge. A Flow Frequency Determination for the receiving stream was generated February 23, 2016, and is included in Appendix A. The “Wet Season” or “High Flow” months are December through May.

| Stream Information | | | |
|------------------------|------|---------------|-----|
| 90% Annual Temp (°C) = | 22.1 | 90% pH (SU) = | 8.5 |
| 90% Wet Temp (°C) = | 15.8 | 10% pH (SU) = | 7.8 |
| Mean Hardness (mg/L) = | 242 | | |

All toxic pollutants, including Ammonia-N and TRC, are assumed absent in the receiving stream because there are no data for these parameters directly above the discharge.

Discharge: The pH and temperature values were obtained from the daily operational data submitted by the permittee. The hardness value was submitted on the application.

| Effluent Information | | | |
|------------------------|------|---------------|-----|
| 90% Annual Temp (°C) = | 23.5 | 90% pH (SU) = | 8.0 |
| 90% Wet Temp (°C) = | 18.7 | 10% pH (SU) = | 7.5 |
| Mean Hardness (mg/L) = | 293 | | |

Fact Sheet – VPDES Permit No. VA0065552 – Opequon WRF

WQC and WLAs were calculated for the WQS parameters for which data are available. The resulting WQC and WLAs are presented in this appendix. Current agency guidelines recommends the evaluation of toxic pollutant limits for TRC and Ammonia-N be based on default effluent concentrations of 20 mg/L and 9 mg/L, respectively. The effluent data were analyzed per the protocol for evaluation of effluent toxic pollutants included in this appendix with the following results:

- TRC: Limits identical to previous limits were determined to be necessary and have been carried forward.
- Ammonia-N: More stringent Ammonia-N (Jun-Nov) and Ammonia-N (Dec-May) limits have been determined to be necessary. This change is due to changes in 90th percentile values for pH and temperature in the effluent. Based on the facility's effluent data a schedule of compliance for meeting the more stringent limits has not been provided.
- Chloride: Limits were not determined to be necessary and have not been added; however, monitoring at a frequency of 1/6 Months has been added with no limit because the WLA for chloride is low and regular monitoring is advisable for future evaluation of the need for a limit.
- Monitoring data is needed for the pollutant listed in Attachment A. The permittee must monitor the effluent at Outfall 001 for the substance noted in Attachment A of the permit once after the start of the third year from the permit's effective date.

WQC-WLA SPREADSHEET INPUT

| WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------|--|----------------------------------------------|--|
| Facility Name: Opequon WRF | | Permit No.: VA0065552 | | Version: OWP Guidance Memo 00-2011 (8/24/00) | |
| Receiving Stream: Opequon Creek | | Date: 5/16/2016 | | | |
| Stream Information | | Stream Flows | | Mixing Information | |
| Mean Hardness (as CaCO3) = 242 mg/L | | 1Q10 (Annual) = 0.69 MGD | | Annual - 1Q10 Flow = 87.41 % | |
| 90% Temperature (Annual) = 22.1 deg C | | 7Q10 (Annual) = 1.55 MGD | | - 7Q10 Flow = 100 % | |
| 90% Temperature (Wet season) = 15.8 deg C | | 30Q10 (Annual) = 1.41 MGD | | - 30Q10 Flow = 100 % | |
| 90% Maximum pH = 8.5 SU | | 1Q10 (Wet season) = 2.01 MGD | | Wet Season - 1Q10 Flow = 95.33 % | |
| 10% Maximum pH = 7.8 SU | | 30Q10 (Wet season) = 4.30 MGD | | - 30Q10 Flow = 100 % | |
| Tier Designation = 1 | | 30Q5 = 2.02 MGD | | | |
| Public Water Supply (PWS) Y/N? = N | | Harmonic Mean = 6.66 MGD | | | |
| V(alley) or P(iedmont)? = V | | | | | |
| Trout Present Y/N? = N | | | | | |
| Early Life Stages Present Y/N? = Y | | | | | |
| Effluent Information | | | | | |
| Mean Hardness (as CaCO3) = 293 mg/L | | | | | |
| 90% Temp (Annual) = 23.5 deg C | | | | | |
| 90% Temp (Wet season) = 18.7 deg C | | | | | |
| 90% Maximum pH = 8.0 SU | | | | | |
| 10% Maximum pH = 7.5 SU | | | | | |
| Current Discharge Flow = 12.6 MGD | | | | | |
| Discharge Flow for Limit Analysis = 12.6 MGD | | | | | |
| Footnotes: | | | | | |
| 1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise. | | | | | |
| 2. All flow values are expressed as Million Gallons per Day (MGD). | | | | | |
| 3. Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals. | | | | | |
| 4. Hardness expressed as mg/l CaCO3. Standards calculated using Hardness values in the range of 25-400 mg/l CaCO3. | | | | | |
| 5. "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only. | | | | | |
| 6. Carcinogen "Y" indicates carcinogenic parameter. | | | | | |
| 7. Ammonia WQSs selected from separate tables, based on pH and temperature. | | | | | |
| 8. Metals measured as Dissolved, unless specified otherwise. | | | | | |
| 9. WLA = Waste Load Allocation (based on standards). | | | | | |
| 10. WLA = Waste Load Allocation (based on standards). | | | | | |
| 11. WLAs are based on mass balances (less background, if data exist). | | | | | |
| 12. Acute - 1 hour avg. concentration not to be exceeded more than 1/3 years. | | | | | |
| 13. Chronic - 4 day avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/3 years. | | | | | |
| 14. Mass balances employ 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows. | | | | | |
| 15. Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document). | | | | | |

WQC-WLA SPREADSHEET OUTPUT

| Facility Name: Opequon WRF | | Permit No.: VA0065552 | | WATER QUALITY CRITERIA | | | | NON-ANTIDEGRADATION | | | |
|------------------------------------|--|--------------------------|--|---------------------------------------------|--------------|-----------------------|----------------------|------------------------|--------------|--------------|--|
| Receiving Stream: Opequon Creek | | Date: 5/16/2016 | | 12,600 MGD Discharge Flow - Mix per "Mixer" | | | | WASTE LOAD ALLOCATIONS | | | |
| | | | | 12,600 MGD Discharge Flow - Mix per "Mixer" | | | | | | | |
| | | | | Aquatic Protection | | Human Health | | Aquatic Protection | | Human Health | |
| Toxic Parameter and Form | | Carcinogen? | | Acute | Chronic | Public Water Supplies | Other Surface Waters | Acute | Chronic | Health | |
| Ammonia-N (Annual) | | N | | 8.2E+00 mg/L | 1.3E+00 mg/L | None | None | 8.6E+00 mg/L | 1.5E+00 mg/L | N/A | |
| Ammonia-N (Wet Season) | | N | | 7.8E+00 mg/L | 1.7E+00 mg/L | None | None | 9.0E+00 mg/L | 2.3E+00 mg/L | N/A | |
| Antimony | | N | | None | None | 5.6E+00 | 6.4E+02 | N/A | N/A | 7.4E+02 | |
| Bis(2-Ethylhexyl) Phthalate | | Y | | None | None | 1.2E+01 | 2.2E+01 | N/A | N/A | 3.4E+01 | |
| Chloride | | N | | 8.6E+02 mg/L | 2.3E+02 mg/L | 2.5E+02 mg/L | None | 9.0E+02 mg/L | 2.6E+02 mg/L | N/A | |
| Chlorine, Total Residual | | N | | 1.9E-02 mg/L | 1.1E-02 mg/L | None | None | 2.0E-02 mg/L | 1.2E-02 mg/L | N/A | |
| Chlorodibromomethane | | Y | | None | None | 4.0E+00 | 1.3E+02 | N/A | N/A | 2.0E+02 | |
| Chloroform | | N | | None | None | 3.4E+02 | 1.1E+04 | N/A | N/A | 1.3E+04 | |
| Chromium (+3) | | N | | 1.4E+03 | 1.8E+02 | None | None | 1.4E+03 | 2.0E+02 | N/A | |
| Chromium (+6) | | N | | 1.6E+01 | 1.1E+01 | None | None | 1.7E+01 | 1.2E+01 | N/A | |
| Copper | | N | | 3.7E+01 | 2.2E+01 | 1.3E+03 | None | 3.8E+01 | 2.5E+01 | N/A | |
| Dichlorobromomethane | | Y | | None | None | 5.5E+00 | 1.7E+02 | N/A | N/A | 2.6E+02 | |
| Nickel | | N | | 4.5E+02 | 5.0E+01 | 6.1E+02 | 4.6E+03 | 4.7E+02 | 5.6E+01 | 5.3E+03 | |
| Zinc | | N | | 2.9E+02 | 2.9E+02 | 7.4E+03 | 2.6E+04 | 3.0E+02 | 3.2E+02 | 3.0E+04 | |

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PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS

Toxic pollutants were evaluated in accordance with OWP Guidance Memo No. 00-2011. Acute and Chronic WLAs (WLA_a and WLA_c) were analyzed according to the protocol below using a statistical approach (STAT.exe) to determine the necessity and magnitude of limits. Human Health WLAs (WLA_{hh}) were analyzed according to the same protocol through a simple comparison with the effluent data. If the WLA_{hh} exceeded the effluent datum or data mean, no limits were required. If the effluent datum or data mean exceeded the WLA_{hh} , the WLA_{hh} was imposed as the limit.

Since there are no data available for any toxic pollutants immediately upstream of this discharge, all upstream (background) pollutant concentrations are assumed to be "0".

The steps used in evaluating the effluent data are as follows:

- A. If all data are reported as "below detection" and at least one detection level is \leq the required Quantification Level (QL) or if all data are below the required QL then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.
- B. If all data are reported as "below detection", and all detection levels are $>$ the required QL, then an evaluation is performed in which the pollutant is assumed present at the lowest reported detection level.
 - B.1. If the evaluation indicates that no limits are needed, then the existing data set is adequate and no further monitoring is required.
 - B.2. If the evaluation indicates that limits are needed, then the existing data set is inadequate to make a determination and additional monitoring is required.
- C. If any data value is reported as detectable at or above the required QL, then the data are adequate to determine whether effluent limits are needed.
 - C.1. If the evaluation indicates that no limits are needed, then no further monitoring is required.
 - C.2. If the evaluation indicates that limits are needed, then the limits and associated requirements are specified in the draft permit.
 - C.3. (Exception for Metals data only) If the evaluation indicates that limits are needed, but the data are reported as a form other than "Dissolved" (except for Selenium), then the existing data set is inadequate to make a determination and additional monitoring is required.

Fact Sheet – VPDES Permit No. VA0065552 – Opequon WRF

| Parameter | CASRN | QL (ug/L) | Data (ug/L unless noted otherwise) | Source of Data | Data Eval |
|--------------------------------------------------------|------------|--------------|---------------------------------------|-------------------|--------------|
| METALS | | | | | |
| Antimony, dissolved | 7440-36-0 | 0.2 | 0.392 | b | C.1 |
| Arsenic, dissolved | 7440-38-2 | 1.0 | <1.0 | b | A |
| Barium, dissolved | 7440-39-3 | --- | Applicable to PWS waters only | --- | --- |
| Cadmium, dissolved | 7440-43-9 | 0.3 | <0.10 | b | A |
| Chromium III, dissolved | 16065-83-1 | 0.5 | <1.0 | b | B.1 |
| Chromium VI, dissolved | 18540-29-9 | 0.5 | <1.0 | b | B.1 |
| Chromium, Total | 7440-47-3 | --- | Applicable to PWS waters only | --- | --- |
| Copper, dissolved | 7440-50-8 | 0.5 | 4.61 | b | C.1 |
| Iron, dissolved | 7439-89-6 | 1.0 | Applicable to PWS waters only | --- | --- |
| Lead, dissolved | 7439-92-1 | 0.5 | 0.125 | b | A |
| Manganese, dissolved | 7439-96-5 | 0.2 | Applicable to PWS waters only | --- | --- |
| Mercury, dissolved | 7439-97-6 | 1.0 | 0.000926 | b | A |
| Nickel, dissolved | 7440-02-0 | 0.5 | 7.09 | b | C.1 |
| Selenium, total recoverable | 7782-49-2 | 2.0 | <2.0, <1.0, <10.0 | b,c | A |
| Silver, dissolved | 7440-22-4 | 0.2 | <0.10 | b | A |
| Thallium, dissolved | 7440-28-0 | --- | <0.10 | b | A |
| Zinc, dissolved | 7440-66-6 | 2.0 | 32.3 | b | C.1 |
| PESTICIDES/PCBS | | | | | |
| Aldrin ^c | 309-00-2 | 0.05 | <0.05 | b | A |
| Chlordane ^c | 57-74-9 | 0.2 | <0.2 | b | A |
| Chlorpyrifos | 2921-88-2 | --- | <0.2 | b | A |
| DDD ^c | 72-54-8 | 0.1 | <0.05 | b | A |
| DDE ^c | 72-55-9 | 0.1 | <0.05 | b | A |
| DDT ^c | 50-29-3 | 0.1 | <0.05 | b | A |
| Demeton | 8065-48-3 | --- | <1 | b | A |
| Diazinon | 333-41-5 | --- | <1 | b | A |
| Dieldrin ^c | 60-57-1 | 0.1 | <0.05 | b | A |
| Alpha-Endosulfan | 959-98-8 | 0.1 | <0.05 | b | A |
| Beta-Endosulfan | 33213-65-9 | 0.1 | <0.05 | b | A |
| Alpha-Endosulfan + Beta-Endosulfan | | --- | <0.1 | b | A |
| Endosulfan Sulfate | 1031-07-8 | 0.1 | <0.05 | b | A |
| Endrin | 72-20-8 | 0.1 | <0.05 | b | A |
| Endrin Aldehyde | 7421-93-4 | --- | <0.05 | b | A |
| Guthion | 86-50-0 | --- | <1 | b | A |
| Heptachlor ^c | 76-44-8 | 0.05 | <0.05 | b | A |
| Heptachlor Epoxide ^c | 1024-57-3 | --- | <0.05 | b | A |
| Hexachlorocyclohexane Alpha-BHC ^c | 319-84-6 | --- | <0.05 | b | A |
| Hexachlorocyclohexane Beta-BHC ^c | 319-85-7 | --- | <0.05 | b | A |
| Hexachlorocyclohexane Gamma-BHC (synonym = Lindane) | 58-89-9 | --- | <0.05 | b | A |
| Kepone | 143-50-0 | --- | <5 | b | A |
| Malathion | 121-75-5 | --- | <1 | b | A |
| Methoxychlor | 72-43-5 | --- | <0.05 | b | A |
| Mirex | 2385-85-5 | --- | <0.05 | b | A |

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| Parameter | CASRN | QL (ug/L) | Data (ug/L unless noted otherwise) | Source of Data | Data Eval |
|-----------------------------------------|-----------|--------------|---------------------------------------|-------------------|--------------|
| Parathion | 56-38-2 | --- | <1 | b | A |
| PCB Total ^C | 1336-36-3 | 7.0 | <0.5 | b | A |
| Toxaphene ^C | 8001-35-2 | 5.0 | <0.5 | b | A |
| BASE NEUTRAL EXTRACTABLES | | | | | |
| Acenaphthene | 83-32-9 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| Anthracene | 120-12-7 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| Benzidine ^C | 92-87-5 | --- | <5 | b | A |
| Benzo (a) anthracene ^C | 56-55-3 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| Benzo (b) fluoranthene ^C | 205-99-2 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| Benzo (k) fluoranthene ^C | 207-08-9 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| Benzo (a) pyrene ^C | 50-32-8 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| Bis 2-Chloroethyl Ether ^C | 111-44-4 | --- | <5, <10.0, <10.0, <10.0 | b,c | A |
| Bis 2-Chloroisopropyl Ether | 108-60-1 | --- | <5, <10.0, <10.0, <10.0 | b,c | A |
| Bis-2-Ethylhexyl Phthalate ^C | 117-81-7 | 10.0 | <5, 45.3, 21.1, 41.1 | b,c | C.1 |
| Butyl benzyl phthalate | 85-68-7 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| 2-Chloronaphthalene | 91-58-7 | --- | <5, <10.0, <10.0, <10.0 | b,c | A |
| Chrysene ^C | 218-01-9 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| Dibenz(a,h)anthracene ^C | 53-70-3 | 20.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| 1,2-Dichlorobenzene | 95-50-1 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| 1,3-Dichlorobenzene | 541-73-1 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| 1,4-Dichlorobenzene | 106-46-7 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| 3,3-Dichlorobenzidine ^C | 91-94-1 | --- | <5, <20.0, <20.0, <20.0 | b,c | A |
| Diethyl phthalate | 84-66-2 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| Dimethyl phthalate | 131-11-3 | --- | <5, <10.0, <10.0, <10.0 | b,c | A |
| Di-n-Butyl Phthalate | 84-74-2 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| 2,4-Dinitrotoluene | 121-14-2 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| 1,2-Diphenylhydrazine ^C | 122-66-7 | --- | <5 | b | A |
| Fluoranthene | 206-44-0 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| Fluorene | 86-73-7 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| Hexachlorobenzene ^C | 118-74-1 | --- | <5, <10.0, <10.0, <10.0 | b,c | A |
| Hexachlorobutadiene ^C | 87-68-3 | --- | <5, <10.0, <10.0, <10.0 | b,c | A |
| Hexachlorocyclopentadiene | 77-47-4 | --- | <5, <10.0, <10.0, <10.0 | b,c | A |
| Hexachloroethane ^C | 67-72-1 | --- | <5, <10.0, <10.0, <10.0 | b,c | A |
| Indeno(1,2,3-cd)pyrene ^C | 193-39-5 | 20.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| Isophorone ^C | 78-59-1 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| Nitrobenzene | 98-95-3 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| N-Nitrosodimethylamine ^C | 62-75-9 | --- | <5, <10.0, <10.0, <10.0 | b,c | A |
| N-Nitrosodi-n-propylamine ^C | 621-64-7 | --- | <5, <10.0, <10.0, <10.0 | b,c | A |
| N-Nitrosodiphenylamine ^C | 86-30-6 | --- | <5, <10.0, <10.0, <10.0 | b,c | A |
| Pyrene | 129-00-0 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| 1,2,4-Trichlorobenzene | 120-82-1 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| VOLATILES | | | | | |
| Acrolein | 107-02-8 | --- | <50 | b | A |
| Acrylonitrile ^C | 107-13-1 | --- | <50 | b | A |

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| Parameter | CASRN | QL (ug/L) | Data (ug/L unless noted otherwise) | Source of Data | Data Eval |
|-------------------------------------------|------------|--------------|----------------------------------------------------------------------|-------------------|--------------|
| Benzene ^C | 71-43-2 | 10.0 | <5, <1.0, <1.0, <1.0 | b,c | A |
| Bromoform ^C | 75-25-2 | 10.0 | <5, <1.0, <1.0, <1.0 | b,c | A |
| Carbon Tetrachloride ^C | 56-23-5 | 10.0 | <5, <1.0, <1.0, <1.0 | b,c | A |
| Chlorobenzene | 108-90-7 | 50.0 | <5, <1.0, <1.0, <1.0 | b,c | A |
| Chlorodibromomethane ^C | 124-48-1 | 10.0 | <5, 2.3, 1.4 | b,c | A |
| Chloroform | 67-66-3 | 10.0 | 17, 3.0, 9.5, 12.3 | b,c | C.1 |
| Dichlorobromomethane ^C | 75-27-4 | 10.0 | 13, 5.0, 3.9 | b,c | C.1 |
| 1,2-Dichloroethane ^C | 107-06-2 | 10.0 | <5, <1.0, <1.0, <1.0 | b,c | A |
| 1,1-Dichloroethylene | 75-35-4 | 10.0 | <5, <1.0, <1.0, <1.0 | b,c | A |
| 1,2-trans-dichloroethylene | 156-60-5 | --- | <5, <1.0, <1.0, <1.0 | b,c | A |
| 1,2-Dichloropropane ^C | 78-87-5 | --- | <5, <1.0, <1.0, <1.0 | b,c | A |
| 1,3-Dichloropropene ^C | 542-75-6 | --- | <5, <1.0, <1.0, <1.0 | b,c | A |
| Ethylbenzene | 100-41-4 | 10.0 | <5, <1.0, <1.0, <1.0 | b,c | A |
| Methyl Bromide | 74-83-9 | --- | <10, <2.0, <2.0, <2.0 | b,c | A |
| Methylene Chloride ^C | 75-09-2 | 20.0 | <5, <2.0, <2.0, <2.0 | b,c | A |
| 1,1,2,2-Tetrachloroethane ^C | 79-34-5 | --- | <5, <1.0, <1.0, <1.0 | b,c | A |
| Tetrachloroethylene | 127-18-4 | 10.0 | <5, <1.0, <1.0, <1.0 | b,c | A |
| Toluene | 10-88-3 | 10.0 | <5, <1.0, <1.0, <1.0 | b,c | A |
| 1,1,2-Trichloroethane ^C | 79-00-5 | --- | <5, <1.0, <1.0, <1.0 | b,c | A |
| Trichloroethylene ^C | 79-01-6 | 10.0 | <5, <1.0, <1.0, <1.0 | b,c | A |
| Vinyl Chloride ^C | 75-01-4 | 10.0 | <10, <1.0, <1.0, <1.0 | b,c | A |
| RADIONUCLIDES | | | | | |
| Beta Particle & Photon Activity (mrem/yr) | N/A | --- | Applicable to PWS waters only | --- | --- |
| Combined Radium 226 and 228 (pCi/L) | N/A | --- | Applicable to PWS waters only | --- | --- |
| Gross Alpha Particle Activity (pCi/L) | N/A | --- | Applicable to PWS waters only | --- | --- |
| Uranium | N/A | --- | Applicable to PWS waters only | --- | --- |
| ACID EXTRACTABLES | | | | | |
| 2-Chlorophenol | 95-57-8 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| 2,4-Dichlorophenol | 120-83-2 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| 2,4-Dimethylphenol | 105-67-9 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| 2,4-Dinitrophenol | 51-28-5 | --- | <20, <50.0, <50.0, <50.0 | b,c | A |
| 2-Methyl-4,6-Dinitrophenol | 534-52-1 | --- | <5, <20.0, <20.0, <20.0 | b,c | A |
| Nonylphenol | 104-40-51 | --- | <5 | b | A |
| Pentachlorophenol ^C | 87-86-5 | 50.0 | <10, <25.0, <25.0, <25.0 | b,c | A |
| Phenol | 108-95-2 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| 2,4,6-Trichlorophenol ^C | 88-06-2 | 10.0 | <5, <10.0, <10.0, <10.0 | b,c | A |
| MISCELLANEOUS | | | | | |
| Ammonia-N (mg/L) (Jun-Dec) | 766-41-7 | 0.2 mg/L | Default = 9 mg/L | a | C.2 |
| Ammonia-N (mg/L) (Jan-May) | 766-41-7 | 0.2 mg/L | Default = 9 mg/L | a | C.2 |
| Chloride (mg/L) | 16887-00-6 | --- | 235, 133, 223, 133, 173, 173, 175, 181, 168, 152, 176, 188, 183, 196 | b,d | C.1 |
| TRC (mg/L) | 7782-50-5 | 0.1 mg/L | Default = 20 mg/L | a | C.2 |
| Cyanide, Free | 57-12-5 | 10.0 | <5 | b | A |

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| Parameter | CASRN | QL (ug/L) | Data (ug/L unless noted otherwise) | Source of Data | Data Eval |
|-----------------------------------------------------------------|------------|--------------|-------------------------------------------------|-------------------|--------------|
| 2,4-Dichlorophenoxy acetic acid (synonym = 2,4-D) | 94-75-7 | --- | Applicable to PWS waters only | --- | --- |
| Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin)(ppq) | 1746-01-6 | 0.01 | Applicable to Paper Mills & Oil Refineries only | --- | --- |
| Foaming Agents (as MBAS) | N/A | --- | Applicable to PWS waters only | --- | --- |
| Sulfide, dissolved | 18496-25-8 | 100 | NEW REQUIREMENT. Needs to be sampled. | | |
| Hydrogen Sulfide | 7783064 | --- | <2.00 | b | A |
| Nitrate as N (mg/L) | 14797-55-8 | --- | Applicable to PWS waters only | --- | --- |
| Sulfate (mg/L) | N/A | --- | Applicable to PWS waters only | --- | --- |
| Total Dissolved Solids (mg/L) | N/A | --- | Applicable to PWS waters only | --- | --- |
| Tributyltin | 60-10-5 | --- | <0.03 | b | A |
| 2-(2,4,5-Trichlorophenoxy) propionic acid (synonym = Silvex) | 93-72-1 | --- | Applicable to PWS waters only | --- | --- |
| Hardness (mg/L as CaCO ₃) | 471-34-1 | --- | 337, 209, 324, 303 | b,c | --- |

The **superscript "C"** following the parameter name indicates that the substance is a known or suspected carcinogen; human health criteria at risk level 10⁻⁵.

CASRN = Chemical Abstract Service Registry Number for each parameter is referenced in the current Water Quality Standards. A unique numeric identifier designating only one substance. The Chemical Abstract Service is a division of the American Chemical Society.

“Source of Data” codes:

a = default effluent concentration
b = data from permittee monitoring, submitted 10/24/11
c = data from permittee monitoring, submitted with reissuance application
d= additional data submitted 4/7/16

"Data Evaluation" codes:

See section titled PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS for an explanation of the code used.

Fact Sheet – VPDES Permit No. VA0065552 – Opequon WRF

STAT.EXE RESULTS:

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><u>Ammonia-N (Jun-Dec)</u> Chronic averaging period = 30 WLAa = 8.6 WLAc = 1.5 Q.L. = 0.2 # samples/mo. = 30 # samples/wk. = 7</p> <p>Summary of Statistics: # observations = 1 Expected Value = 9 Variance = 29.16 C.V. = 0.6 97th percentile daily values = 21.9007 97th percentile 4 day average = 14.9741 97th percentile 30 day average= 10.8544 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 3.02650514012447 Average Weekly Limit = 1.84830850034607 Average Monthly Limit = 1.5</p> <p>The data are: 9</p> | <p><u>Ammonia-N (Jan-May)</u> Chronic averaging period = 30 WLAa = 9 WLAc = 2.3 Q.L. = 0.2 # samples/mo. = 30 # samples/wk. = 7</p> <p>Summary of Statistics: # observations = 1 Expected Value = 9 Variance = 29.16 C.V. = 0.6 97th percentile daily values = 21.9007 97th percentile 4 day average = 14.9741 97th percentile 30 day average= 10.8544 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 4.64064121485751 Average Weekly Limit = 2.83407303386397 Average Monthly Limit = 2.3</p> <p>The data are: 9</p> | <p><u>TRC</u> Chronic averaging period = 4 WLAa = 0.02 WLAc = 0.012 Q.L. = 0.1 # samples/mo. = 360 # samples/wk. = 84</p> <p>Summary of Statistics: # observations = 1 Expected Value = 20 Variance = 144 C.V. = 0.6 97th percentile daily values = 48.6683 97th percentile 4 day average = 33.2758 97th percentile 30 day average= 24.1210 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 1.75508974086388E-02 Average Weekly Limit = 8.13909399503221E-03 Average Monthly Limit = 7.64146204473373E-03</p> <p>The data are: 20</p> |
| <p><u>Chloride</u> Chronic averaging period = 4 WLAa = 900 WLAc = 260 Q.L. = 1 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics: # observations = 14 Expected Value = 177.965 Variance = 836.813 C.V. = 0.162546 97th percentile daily values = 238.009 97th percentile 4 day average = 206.628 97th percentile 30 day average= 187.899 # < Q.L. = 0 Model used = lognormal</p> <p>No Limit is required for this material</p> <p>The data are: 235, 133, 223, 133, 173, 173, 175, 181 168, 152, 176, 188, 183, 196</p> | <p><u>Chromium III, Dissolved</u> Chronic averaging period = 4 WLAa = 1400 WLAc = 200 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics: # observations = 1 Expected Value = 1 Variance = .36 C.V. = 0.6 97th percentile daily values = 2.43341 97th percentile 4 day average = 1.66379 97th percentile 30 day average= 1.20605 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 1</p> | <p><u>Chromium VI, Dissolved</u> Chronic averaging period = 4 WLAa = 17 WLAc = 12 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics: # observations = 1 Expected Value = 1 Variance = .36 C.V. = 0.6 97th percentile daily values = 2.43341 97th percentile 4 day average = 1.66379 97th percentile 30 day average= 1.20605 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 1</p> |
| <p><u>Copper, Dissolved</u> Chronic averaging period = 4 WLAa = 38 WLAc = 25 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics: # observations = 1 Expected Value = 4.61 Variance = 7.65075 C.V. = 0.6 97th percentile daily values = 11.2180 97th percentile 4 day average = 7.67007 97th percentile 30 day average= 5.55990 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 4.61</p> | <p><u>Nickel, Dissolved</u> Chronic averaging period = 4 WLAa = 470 WLAc = 56 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics: # observations = 1 Expected Value = 7.09 Variance = 18.0965 C.V. = 0.6 97th percentile daily values = 17.2529 97th percentile 4 day average = 11.7962 97th percentile 30 day average= 8.55091 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 7.09</p> | <p><u>Zinc, Dissolved</u> Chronic averaging period = 4 WLAa = 300 WLAc = 320 Q.L. = 2.0 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics: # observations = 1 Expected Value = 32.3 Variance = 375.584 C.V. = 0.6 97th percentile daily values = 78.5993 97th percentile 4 day average = 53.7404 97th percentile 30 day average= 38.9555 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 32.3</p> |

Fact Sheet – VPDES Permit No. VA0065552 – Opequon WRF

WHOLE EFFLUENT TOXICITY (WET) EVALUATION:

Applicability of TMP: DEQ guidance states that a municipal sewage treatment plant with a design flow greater than or equal to 1.0 MGD or having a pretreatment program will be subject to Toxics Management Program (TMP) requirements (TMP Guidance Memo No. 00-2012, 8/4/2000, Part IV.2.A). This facility has a flow of 12.6 MGD and has a pretreatment program.

Summary of Chronic Toxicity Testing: The previous permit required annual chronic testing using *Ceriodaphnia dubia* and *Pimephales promelas*. Table 1 contains a summary of the toxicity testing results during the term of the permit. These data were evaluated using the procedures outlined in the TMP guidance.

Acute Toxicity Testing: Acute testing was required by the previous permit if any chronic test 48-hour $LC_{50} \leq 100\%$. Table 1 indicates that the 48-hr LC_{50} was $> 100\%$ in all of the chronic toxicity tests of the previous permit term; therefore, acute toxicity testing is not required in the reissued permit. However, the permit carries forward language that should chronic WET monitoring result in a 48-hour $LC_{50} \leq 100\%$, the permittee must commence acute toxicity testing. Because the IWCa $> 33\%$, acute tests are based on the calculation of a valid NOAEC.

Sample Type: A sample type of 24 hour composite is representative of the discharge.

Calculation of WLAs: Acute and chronic WLAs were generated from the WETLimit10.xls spreadsheet by entering the design flow, stream flows, and stream mix percentages for the respective stream flows.

Dilution Series: The dilution series recommended for chronic tests is contained in Table 2. The recommended dilution series for acute tests is the standard 0.5 series.

Stat.exe Limit Evaluation: The WLAs are used in the Department's Stat.exe program in order to perform a statistical evaluation of the acute and chronic test results expressed as Toxicity Units (TUs). The toxicity data are analyzed separately by species and test type.

Chronic Stat.exe Limit Evaluation:

The summary of the chronic toxicity testing data are shown in Table 1. The data were not run through Stat.exe because even though all data were $TUc = 1.0$, indicating no toxicity, they would have triggered a limit due to the limited data set and the low $WLAc$ of 1.12 TUc . Since all tests showed no toxicity, which meets the permit criteria for the chronic tests, a WET limit is not required; however, a limit has been carried forward to comply with antibacksliding considerations since there has been no new information upon which to base the removal of the limit. Because new flow information is available which would have justified a less stringent limit when the previous limit was established, had that information been available, the previous limit of 1.56 TUc has been changed to 1.64 TUc . This complies with the antibacksliding provisions of the VPDES Permit Regulation.

Midpoint Check Stat.exe Evaluation:

Because the permit contains a WET limit, a midpoint check is not necessary.

Reissued Permit Requirements: Based upon the information above, the reissued permit will require annual monitoring and limits for chronic toxicity. A most-sensitive species has not been selected, and both species (*Ceriodaphnia dubia* and *Pimephales promelas*) are to be used for the chronic testing.

Peer Review: Bev Carver

Date 4/6/16

Fact Sheet – VPDES Permit No. VA0065552 – Opequon WRF

**Table 1
Summary of Chronic Toxicity Testing**

| Monitoring Period | Test Start Date | Chronic 3-Brood Static Renewal Survival and Reproduction <i>Ceriodaphnia dubia</i> (TUc) | | | | Chronic 7-Day Static Renewal Survival and Growth <i>Pimephales promelas</i> (TUc) | | | |
|------------------------|-----------------|------------------------------------------------------------------------------------------------|-------------|------------------------|----------------|-----------------------------------------------------------------------------------------|--------------|------------------------|----------------|
| | | Survival (TUc) | Repro (TUc) | 48-hr LC ₅₀ | % Surv in 100% | Survival (TUc) | Growth (TUc) | 48-hr LC ₅₀ | % Surv in 100% |
| 1st Qtr | July 2011 | 1.0 | 1.0 | >100 | 100 | 1.0 | 1.0 | >100 | 100 |
| 2 nd Qtr | October 2011 | 1.0 | 1.0 | >100 | 100 | 1.0 | 1.0 | >100 | 100 |
| 3 rd Qtr | 1/17/12 | 1.0 | 1.0 | >100 | 100 | 1.0 | 1.0 | >100 | 93 |
| 4 th Qtr | 4/3/12 | 1.0 | 1.0 | >100 | 100 | 1.0 | 1.0 | >100 | 98 |
| 1 st Annual | 1/15/13 | 1.0 | 1.0 | >100 | 100 | 1.0 | 1.0 | >100 | 78 |
| 2 nd Annual | 1/14/14 | 1.0 | 1.0 | >100 | 100 | 1.0 | 1.0 | >100 | 100 |
| 3 rd Annual | 1/20/15 | 1.0 | 1.0 | >100 | 100 | 1.0 | 1.0 | >100 | 95 |
| 4 th Annual | 4/12/16 | 1.0 | 1.0 | >100 | 100 | 1.0 | 1.0 | >100 | 87.5 |

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Table 2
WETLim10.xls Spreadsheet

| Spreadsheet for determination of WET test endpoints or WET limits | | | | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------|-----------------|
| Excel 97 Revision Date: 12/13/13 File: WETLIM10.xls (MIX.EXE required also) | | | Acute Endpoint/Permit Limit | | Use as LC ₅₀ in Special Condition, as TU _a on DMR | | | | |
| ACUTE | | | 100% = | NOAEC | LC ₅₀ = | NA | % Use as | NA | TU _a |
| ACUTE WLA _a | | | 0.3143602 | Note: Inform the permittee that if the mean of the data exceeds this TU _a : 1.0 a limit may result using STATS.EXE | | | | | |
| Chronic Endpoint/Permit Limit | | | Use as NOEC in Special Condition, as TU _c on DMR | | | | | | |
| CHRONIC | | | 1.64249459 TU _c | NOEC = | 61 % Use as | 1.63 | TU _c | | |
| BOTH* | | | 3.14360222 TU _c | NOEC = | 32 % Use as | 3.12 | TU _c | | |
| AML | | | 1.64249459 TU _c | NOEC = | 61 % Use as | 1.63 | TU _c | | |
| Enter data in the cells with blue type: | | | | | | | | | |
| Entry Date: | 05/17/16 | | ACUTE WLA _{a,c} | | 3.1436021 | Note: Inform the permittee that if the mean of the data exceeds this TU _c : 1.0 a limit may result using STATS.EXE | | | |
| Facility Name: | Opequon WRF | | CHRONIC WLA _c | | 1.1230159 | | | | |
| VPDES Number: | VA0065552 | | * Both means acute expressed as chronic | | | | | | |
| Outfall Number: | 1 | | | | | | | | |
| % Flow to be used from MIX.EXE | | | Diffuser /modeling study? | | | | | | |
| Plant Flow: | 12.6 MGD | | Enter Y/N n | | | | | | |
| Acute 1Q10: | 0.69 MGD | | 87.41 % | | Acute 1 :1 | | | | |
| Chronic 7Q10: | 1.55 MGD | | 100 % | | Chronic 1 :1 | | | | |
| Are data available to calculate CV? (Y/N) | | | N | | (Minimum of 10 data points, same species, needed) | | | Go to Page 2 | |
| Are data available to calculate ACR? (Y/N) | | | N | | (NOEC<LC50, do not use greater/less than data) | | | Go to Page 3 | |
| IWC _a | 95.43192375 % | Plant flow/plant flow + 1Q10 | NOTE: If the IWC _a is >33%, specify the NOAEC = 100% test/endpoint for use | | | | | | |
| IWC _c | 89.0459364 % | Plant flow/plant flow + 7Q10 | | | | | | | |
| Dilution, acute | 1.047867381 | 100/IWC _a | | | | | | | |
| Dilution, chronic | 1.123015873 | 100/IWC _c | | | | | | | |
| WLA _a | 0.314360214 | Instream criterion (0.3 TU _a) X's Dilution, acute | | | | | | | |
| WLA _c | 1.123015873 | Instream criterion (1.0 TU _c) X's Dilution, chronic | | | | | | | |
| WLA _{a,c} | 3.143602143 | ACR X's WLA _a - converts acute WLA to chronic units | | | | | | | |
| ACR -acute/chronic ratio | 10 | LC50/NOEC (Default is 10 - if data are available, use tables Page 3) | | | | | | | |
| CV-Coefficient of variation | 0.6 | Default of 0.6 - if data are available, use tables Page 2) | | | | | | | |
| Constants | eA | 0.4109447 | Default = 0.41 | | | | | | |
| | eB | 0.6010373 | Default = 0.60 | | | | | | |
| | eC | 2.4334175 | Default = 2.43 | | | | | | |
| | eD | 2.4334175 | Default = 2.43 (1 samp) No. of sample 1 | | | | | | |
| **The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTA _{a,c} and MDL using it are driven by the ACR. | | | | | | | | | |
| LTA _{a,c} | 1.29184664 | WLA _{a,c} X's eA | | | | | | | |
| LTA _c | 0.674974428 | WLA _c X's eB | | | | | | | |
| MDL** with LTA _{a,c} | 3.14360222 | TU _c | NOEC = | 31.810640 | (Protects from acute/chronic toxicity) | | | Rounded NOEC's | % |
| MDL** with LTA _c | 1.642494586 | TU _c | NOEC = | 60.883001 | (Protects from chronic toxicity) | | | NOEC = | 32 % |
| AML with lowest LTA | 1.642494586 | TU _c | NOEC = | 60.883001 | Lowest LTA X's eD | | | NOEC = | 61 % |
| IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU _c to TU _a | | | | | | | | | |
| MDL with LTA _{a,c} | 0.314360222 | TU _a | LC50 = | 318.106405 | % Use NOAEC=100% | | | Rounded LC50's | % |
| MDL with LTA _c | 0.164249459 | TU _a | LC50 = | 608.830013 | % Use NOAEC=100% | | | LC50 = | NA % |

| CHRONIC DILUTION SERIES TO RECOMMEND | | |
|--------------------------------------|-------------|-----------------|
| | Limit | |
| | % Effluent | TU _c |
| Dilution series based on data mean | | |
| Dilution series to use for limit | 61 | 1.64 |
| Dilution factor to recommend: | 0.781024968 | |
| Dilution series to recommend: | | |
| | 100.0 | 1.00 |
| | 78.1 | 1.28 |
| | 61.0 | 1.64 |
| | 47.6 | 2.10 |
| | 37.2 | 2.69 |
| Extra dilutions if needed | 29.06 | 3.44 |
| | 22.70 | 4.41 |

APPENDIX C

BASES FOR PERMIT SPECIAL CONDITIONS

Tabulated below are the sections of the permit, with any changes and the reasons for the changes identified. Also provided is the basis for each of the permit special conditions.

| | |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cover Page | Content and format as prescribed by the Guidance Memo No. 14-2003. |
| Part I.A. | <p>Effluent Limitations and Monitoring Requirements: Bases for effluent limits and monitoring requirements provided in previous pages of fact sheet.</p> <p><i>Updates Part I.A.1 of the previous permit with the following:</i></p> <ul style="list-style-type: none"> • The CBOD₅ (Dec-May) limits were changed to BOD₅ (Dec-May) limits. • The monitoring frequency for BOD₅ was changed to 1/Week year-round since the Ammonia-N limits control treatment. • More stringent Ammonia-N limits were included. • Chloride monitoring was added. • Less stringent WET limits were included. • Footnotes were updated. |
| Part I.B. | <p>Additional Total Residual Chlorine (TRC) and E.coli Limitations and Monitoring Requirements: <i>Updates Part I.B of the previous permit. The language regarding a possible waiver of contact tank chlorine requirements based upon E. coli results was removed.</i></p> <p>Required by Sewage Collection and Treatment (SCAT) Regulations, 9VAC25-790 and Water Quality Standards, 9VAC25-260-170, Bacteria; other waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.</p> |
| Part I.C | <p>Effluent Limitations and Monitoring Requirements – Additional Instructions: <i>Updates Part I.C of the previous permit with minor wording changes.</i> Authorized by VPDES Permit Regulation 9 VAC25-31-190 J.4 and 220.I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values. §62.1 44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, this special condition is intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.</p> |
| Part I.D | <p>Pretreatment Program Requirements: <i>Updates Part I.D of the previous permit with minor wording changes.</i> VPDES Permit Regulation 9VAC25-31-730 through 900, and 40 CFR Part 403 require certain existing and new sources of pollution to meet specified regulations.</p> |
| Part I.E | <p>Whole Effluent Toxicity (WET) Requirements: <i>Updates Part I.E of the previous permit with minor wording changes.</i> VPDES Permit Regulation 9VAC25-31-210 and 220.I, requires monitoring in the permit to assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. Monitoring requirements are as prescribed by Guidance Memo No. 00-2012.</p> |
| Part I.F.1 | <p>95% Capacity Reopener: <i>Updates Part I.F.1 of the previous permit with minor wording changes.</i> Required by VPDES Permit Regulation 9VAC25-31-200 B 4 for Publicly Owned Treatment Works (POTW) and Privately Owned Treatment Works (PVOTW) permits.</p> |

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| Part I.F.2 | Indirect Dischargers: <i>Identical to Part I.F.2 of the previous permit.</i> Required by VPDES Permit Regulation 9VAC25-31-200.B.1 and B.2 for Publicly Owned Treatment Works (POTW) and Privately Owned Treatment Works (PVOTW) that receive waste from someone other than the owner of the treatment works. |
| Part I.F.3 | Materials Handling/Storage: <i>Updates Part I.F.3 of the previous permit with minor wording changes.</i> 9VAC25-31-50.A prohibits the discharge of any waste into State waters unless authorized by permit. Code of Virginia §62.1-44.16 and §62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste. |
| Part I.F.4 | O&M Manual Requirement: <i>Updates Part I.F.4 of the previous permit with changes to what is required to be included in the O&M Manual.</i> Required by Code of Virginia Section 62.1-44.19, Sewage Collection and Treatment (SCAT) Regulations 9VAC25-790, and VPDES Permit Regulation 9VAC25-31-190.E for all STPs. |
| Part I.F.5 | CTC/CTO Requirement: <i>Identical to Part I.F.5 of the previous permit.</i> Required by Code of Virginia 62.1-44.19, Sewage Collection and Treatment (SCAT) Regulations 9VAC25-790, and VPDES Permit Regulation 9VAC25-31-190.E for all STPs. |
| Part I.F.6 | SMP Requirement: <i>Updates Part I.F.6 of the previous permit with minor wording changes.</i> VPDES Permit Regulation 9VAC25-31-100.Q, 220.B.2, and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. Technical requirements are derived from the Virginia Pollution Abatement Permit Regulation (9VAC25-32-10 <i>et seq.</i>) |
| Part I.F.7 | Licensed Operator Requirement: <i>Updates Part I.F.7 of the previous permit with minor wording changes.</i> The VPDES Permit Regulation 9VAC25-31-200.C, the Code of Virginia 54.1-2300 <i>et seq.</i> , and Board for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals Regulations (18VAC160-20-10 <i>et seq.</i>), require licensure of operators. A class I license is indicated for this facility. |
| Part I.F.8 | Reliability Class: <i>Identical to Part I.F.8 of the previous permit.</i> Required by Sewage Collection and Treatment (SCAT) Regulations 9VAC25-790 for all municipal facilities. |
| Part I.F.9 | Water Quality Criteria Monitoring: <i>Updates Part I.F.9 of the previous permit with different parameters required to be monitored in Attachment A.</i> State Water Control Law Section 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, Subpart 131.11. To ensure that water quality standards are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit. |
| Part I.F.10 | Treatment Works Closure Plan. <i>Updates Part I.F.10 of the previous permit with minor wording changes.</i> This condition establishes the requirement to submit a closure plan for the treatment works if the treatment facility is being replaced or is expected to close. This is necessary to ensure industrial sites and treatment works are properly closed so that the risk of untreated waste water discharge, spills, leaks and exposure to raw materials is eliminated and water quality maintained. Section 62.1-44.21 requires every owner to furnish when requested plans, specification, and other pertinent information as may be necessary to determine the effect of the wastes from his discharge on the quality of state waters, or such other information as may be necessary to accomplish the purposes of the State Water Control Law. |

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| Part I.F.11 | <p>Reopeners:</p> <p>a. <i>Identical to Part I.F.11.a of the previous permit:</i> Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.</p> <p>b. <i>Identical to Part I.F.11.b of the previous permit:</i> 9VAC25-40-70.A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade.</p> <p>c. <i>Updates Part I.F.11.c of the previous permit with minor wording changes:</i> 9VAC25-31-390.A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.</p> <p>d. <i>Identical to Part I.F.11.c of the previous permit:</i> Required by the VPDES Permit Regulation 9VAC25-31-220.C, for all permits issued to treatment works treating domestic sewage.</p> |
| Part I.F.12 | <p>Suspension of concentration limits for E3/E4 facilities: <i>Updates Part I.F.12 of the previous permit with minor wording changes.</i> 9VAC25-40-70.B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.</p> |
| Part II | <p>Conditions Applicable to All VPDES Permits: <i>Updates Part II of the previous permit.</i> VPDES Permit Regulation 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.</p> |

Deletions:

Part I.F.13 **Stream Model Simulation:** This requirement has been met.